

REMARKS/ARGUMENTS

This case has been carefully reviewed and analyzed in view of the Official Action dated 18 May 2004. Responsive to the rejections made in the Official Action, Claims 1, 4, 5, 6 and 8 have been amended to clarify the language thereof and the combination of elements that form the invention of the subject Patent Application. Additionally, new Claim 12 has been added and Claims 2 – 3, 7 and 9 – 11 have been cancelled by this Amendment.

In the Official Action, the Examiner objected to the drawings under 37 C.F.R. § 1.83(a), because the drawings must show every feature of the invention specified in the Claims. The Examiner stated that the “inter-metal dielectric layer” and the “geometric conductive layer being circular” must be shown in the drawings or the features cancelled from the Claims.

Replacement drawings for Figs. 2, 8A, 8B, 9A and 9B have been provided which now schematically show the inter-metal dielectric layers by dotted lines interposed between the conductive layers, as described in the Specification. It is believed that the description in the Specification and the Claims provide the antecedent basis for the Amendment being made to the drawings. Thus, no new matter has been added by these changes. With respect to the “geometric conductive layer being circular” that subject matter has been cancelled from the Claims and thus, no drawing change is required with respect thereto.

In reviewing the Specification, Applicants found that some of the language was not consistent with terms of art utilized in the United States and included typographical, idiomatic and translational errors. Accordingly, the Specification has been amended by replacement of the original Specification with a Substitute Specification which was the easiest method to correct the errors found therein. A clean copy of the Substitute Specification is attached to this Amendment in compliance with 37 C.F.R. § 1.125. The Substitute Specification includes the same changes as are indicated in the marked-up copy of the original Specification. It is believed that the subject matter disclosed in the Substitute Specification was previously disclosed in the Specification and Claims, as filed, and the accompanying drawing figures. No new matter has been added by these changes.

In the Official Action, the Examiner objected to the Claims due to informalities therein and rejected Claims 1 – 11 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Examiner indicated language in a number of Claims which was unclear and confusing.

Claims 1, 4, 5, 6 and 8 have been amended to correct the language thereof. It is believed that the Claims, as now amended, particularly point out and distinctly claim the subject matter that Applicant regards as the invention.

In the Official Action, the Examiner rejected Claims 1, 2, 4, 7 and 8 under 35 U.S.C. § 102(e), as being anticipated by Yeo et al. U.S. Patent No. 6,611,188

and rejected Claims 3, 5 and 6 under 35 U.S.C. § 103(a), as being obvious over Yeo et al. The Examiner stated that the reference disclosed a multi-level interconnected integrated vertical inductor having conductive lines which form a plurality of conductive layers forming a symmetrical and geometric shape, a dielectric that is deposited between the adjacent layers of conductive material, and vias for the extension of the vertical conductors.

It is respectfully submitted that the invention of the subject Patent Application provides a symmetrically stacked inductor having at least one winding. The inductor includes a plurality of conductive layers, each conductive layer including at least a pair of conductive lines defining a pair of respective portions of geometrically shaped turns of the at least one winding disposed on opposing first and second longitudinally displaced sides thereof. The portions of the turns on each of the conductive layers is symmetric with respect to their position on the winding. At least a first of the plurality of conductive layers has a pair of ports formed thereon and respectively coupled to opposing ends of the at least one winding. The inductor includes an inter-metal dielectric layer disposed between each adjacent pair of the plurality of conductive layers for electrically isolating the adjacent conductive layers. The conductor also includes a plurality of via plugs formed in each inter-metal dielectric layer. Each via plug provides electrical connection of a conductive line on the first side of one conductive layer to a conductive line on the second side of an adjacent conductive layer.

Whereas the Yeo et al reference discloses an integrated vertical spiral inductor wherein each horizontally directed layer has but a single portion of a turn of the winding thereon, and not a pair of respective portions of geometrically shaped turns of the at least one winding disposed on opposing first and second longitudinally displaced sides thereof. Further, the via plugs (a more correct term of art, as vias are simply the openings formed in the dielectric layer and via plugs are the conductive material disposed in the vias) extend to corresponding conductive lines on other conductive layers, but not to provide a connection of a conductive line on the first side of one conductive layer to a conductive line on the second side of an adjacent conductive layer, as now claimed. By the arrangement of the invention of the subject Patent Application, each conductive layer includes portions of a pair of turns that are both symmetrically laid out on the layer and symmetrical with respect to the winding. Thus, the conductive layer which includes the pair of ports, include portions of the turns that are at the end most portions of the winding. As each conductive layer includes portions of turn of the winding that are symmetrical with respect to the winding, the current passing through those turn portions are equal in magnitude and opposite direction.

With respect to Claims 5 and 6, such now call for each conductive layer having a pair of portions of the geometrically shaped turns for each two windings (Claim 5) or three windings (Claim 6), which structure is neither disclosed nor suggested by Yeo et al.

As the Yeo et al. reference fails to disclose each and every one of the elements of the invention of the subject Patent Application, as now claimed, it cannot anticipate that invention. Further, as the reference fails to suggest the combination of elements which form the invention of the subject Patent Application, and in fact teaches away from the claimed structure, it cannot make obvious that invention either.

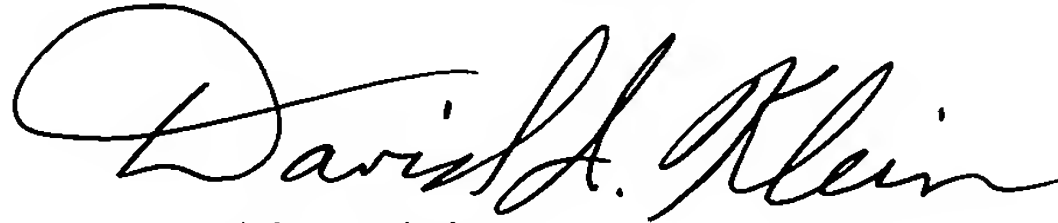
In the Official Action, the Examiner combined the Merrill et al. reference, U. S. Patent No. 5,610,433 with Yeo et al. to make obvious Claims 9 – 11. With respect to Claims 1, 4, 5, 6, 8 and new Claim 12, the Merrill et al. reference does not overcome the deficiencies of Yeo et al. The Merrill et al. reference does not provide for a pair of respective portions of geometrically shaped turns of the winding disposed on opposing first and second longitudinally displaced sides thereof, the portions of the turns on each conductive layer being symmetric with respect to their position on the winding. Additionally, the reference neither discloses nor suggests a stacked inductor having at least one first winding and at least one second winding, wherein the structure includes a plurality of first conductive layers consecutively interspersed and alternating with a plurality of second conductive layers, as now provided in new Claim 12 (directed to the embodiment of FIG. 9A).

Therefore, the combination of Yeo et al. and Merrill et al. cannot make obvious the invention of the subject Patent Application, as now claimed.

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For all the foregoing reasons, it is now believed that the subject Patent Application has been placed in condition for allowance, and such action is respectfully requested.

Respectfully submitted,
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AMENDMENTS TO THE DRAWINGS

The attached five drawing sheets include a change to Figs. 2, 8A, 8B, 9A and 9B, respectively. Each of the five drawing sheets respectively include a replacement for Figs. 2, 8A, 8B, 9A and 9B, which replace the original sheets that include Figs. 2, 8A, 8B, 9A and 9B thereon. In each of Figs. 2, 8A, 8B, 9A and 9B, the previously omitted inter-metal dielectric layers have been depicted by dotted lines interposed between the conductive layers.

ATTACHMENT: Five replacement sheets